

RECOLLECTIONS¹

BOTANICAL REMINISCENCES

RICHARD H. GOODWIN

Dolbia Hill Farm, P.O. Box 2040, Salem, CT 06420

On November first, 1996, at the New England Botanical Club's centennial banquet I was presented with a name tag announcing that I was the member of longest standing in attendance. Then during the festivities I was asked if I would set down some of my botanical recollections for publication in *Rhodora*.

I joined the Club in 1930 as its youngest member, when I was a sophomore at Harvard taking Merritt Lyndon Fernald's course on the taxonomy of vascular plants. The meetings of the Club were held in Boston at the home of the American Academy of Arts and Sciences on Newbury Street. They were attended by a distinguished group of enthusiastic and highly competent amateurs—men who, in the days before automobiles and TV sets, spent their weekends tramping through the countryside from railroad stations and the ends of trolley lines after the tradition of Asa Gray. One of these was Richard J. Eaton, the author of *A Flora of Concord*. These amateurs far outnumbered the professionals. However, it was apparent that Professor Fernald was playing a major role in masterminding the activities of the Club. A fascinating statistic is that up to that time more copies of *Gray's Manual of Botany* had been sold in the United States than any other book with the exception of the Bible.

One of my earliest botanical recollections, when I was six years old, is of an Easter dinner in Cambridge with Uncle Will and Aunt Lilian. Uncle Will was my great uncle, William Gilson Farlow, the father of cryptogamic botany in the United States. He lived on Quincy Street close to the site of the present Harvard Faculty Club. After dinner we were given a tour of the fire-proof wing that housed his rare books and herbarium. This was the core of the Farlow Herbarium, now housed at the end of Divinity Avenue. It was on that visit that I admired a handsome little steel

¹ This is the first in a series of articles to appear occasionally in *Rhodora*. Contributions will be solicited by the Editor-in-Chief, and suggestions are welcome.—Ed.

chest that had a trick way of opening. The Farlows most generously gave this treasure to me.

I entered Harvard in the fall of 1929 with a somewhat nebulous idea that I might become a forester. I loved the outdoors and wild places and had the thought that by entering that field I might be able to contribute toward the rehabilitation of devastated country. Five years earlier I had an experience that strongly influenced this decision. That summer I went West with my family. Our route took us through the Great Lakes by boat, and thence from Duluth by the Great Northern Railroad to Seattle. What I recall most vividly on this trip was a whole day traversing the bleak, burned forests of Minnesota.

In my freshman year I took introductory zoology with George H. Parker, whose lectures I admired for their elegance. Botany came in the second semester with Ralph H. Wetmore. The laboratory assistant was G. Ledyard Stebbins. I enjoyed this course, which launched me on my professional career. One detail which I recall is anything but academic. Ledyard was an earnest fellow, who did his best to help us find what we were supposed to under the microscope. Some of the athletes in the class used to attach test tube clamps to the tail of his coat as he was leaning over someone's scope. It would have served them right if they had had to carry on without those useful little gadgets when heating test tubes over the burner. None of us imagined that this young man would become one of the world's outstanding evolutionary biologists.

My sophomore year found me taking advanced courses largely peopled by graduate students, which presented challenging competition. It was Fernald's course in particular that strongly developed my interest in plants. His lectures were somewhat rambling, but packed full of bits of folklore, natural history, economic botany, and phytogeography. The lab consisted of drawing mounted specimens of species from representative families, which gave us some facility with a drawing pen. But it was in the field that Fernald's teaching really caught fire. He was short and somewhat roly-poly, but could maintain a vigorous pace. When he spotted an interesting plant on terra firma he would recline on the ground beside it, point out its characteristics and expound on whatever was of special interest. Aquatics were a vital part of the flora for Fernald. He would usually lead us into a swamp right over our boots at the first stop. For the rest of the day we would have no

inhibitions about sloshing through the wetlands. The story is told of a time when his enthusiasm for aquatics got him into trouble. He was standing at the end of a small dam where an emergent beckoned from a sheet of duckweed. Stepping forth to collect it, he plopped in over his head. Fernald couldn't swim, but fortunately a football player, standing beside him on the dam, reached over and pulled him out. We understand this student passed the course with a good grade.

The field trips were memorable. I recall my astonishment at finding *Opuntia humifusa* partially smothered by grasses on Cape Cod and the excitement of encountering over eighty species of wildflowers simultaneously in bloom on the slopes of Mt. Equinox. I later participated in a number of forays to Vermont, the purpose of which was to document the ranges of species in northern New England.

In my junior year I started an independent study with Wetmore. He had been working on the cytogenetics of goldenrods and asters, and called my attention to a goldenrod, *Solidago asperula*, that was thought to be a hybrid between two widely distributed species, *S. rugosa* of the uplands and *S. sempervirens*, restricted to sand dunes, salt marshes, and rocky headlands at the edge of the sea. He suggested that I attempt to cross the putative parental types and compare the progeny with *S. asperula*. This I proceeded to do, submitting the results as an honors thesis in the spring of my senior year. My doctoral dissertation, based on developmental studies of these goldenrods, launched me on a research career in experimental plant morphology, which led by steps from plant hormones to growth inhibitors, to effects of light on growth, to fluorescent compounds and finally to patterns of root growth.

Among the problems I faced in carrying on the genetic work with these goldenrods was getting the precious hybrid seeds to germinate. When planted soon after collection only about five percent would start to grow. During an experiment attempting to break dormancy with a freezing and thawing regime, I had some seeds laid out in dishes on my lab table in full sunlight. Suddenly I had nearly one hundred percent germination. I measured the temperature, and it turned out to be about 100°F. This seemed odd, as in nature the seeds germinate in April when the air temperature is about 40°F. Out in the field I measured the temperature of the bare soil, where natural germination takes place. Sure enough, on a sunny day it was 100°F.

A second problem was assuring minimal loss of the delicate seedlings. They were being grown in the greenhouse located on the roof of the Biological Laboratories. I soon discovered that the little pots had to be attended daily and with more tender loving care than that afforded by the fellow in charge of the greenhouse. This was not the kind of lesson learned in undergraduate courses.

Goldenrods are normally biennials. They germinate in the spring, spend the first year getting established, and come into bloom the following year. My third problem was to shorten this cycle in order to speed up the genetic work. Goldenrods are short-day plants, flowering in the fall when the days are short. I discovered that by germinating the plants in the fall and growing them in the greenhouse during the winter, they could be brought into bloom in the spring. Thus it was that several years later I was able to present my fiancée with a bouquet of *Solidago* at our June engagement party.

Later on I became involved with a study of the inheritance of flowering time. Depending upon where they grow along the Atlantic coast, plants of *Solidago sempervirens* respond to different photoperiods, those from the northern portion of the range flowering earlier than those farther south. Plants from Florida, when grown at the latitude of Rochester, New York, remained vegetative and grew to the roof of the greenhouse. In order to cross them with the northern material it was necessary to shorten the day by moving them to the dark. It turned out that several genes were required to account for these differences (Goodwin 1944).

An amusing incident occurred during the spring of my final year at Harvard. I was married by then and Esther and I had spent a morning on the meadow along the Charles River estuary, just across from the Harvard Stadium. We had been making mass collections of goldenrod plants. Formerly a brackish marsh under tidal influence, this area had gradually lost its salinity after the basin had been dammed. Patches of the salt-marsh goldenrod still persisted, but the area had been invaded by the upland species, creating an ideal spot for natural hybridization. While I was collecting the plants, Esther was sitting on a blanket, making tags and placing the specimens in a white vasculum. It rained the following day and late in the morning we were preparing to leave our fourth-floor walk-up to go out to visit my parents in Brookline, as we were feeling the effects of typhoid shots taken in

preparation for our imminent trip to central Africa. The doorbell rang and a voice came up through the speaker.

"This is Officer O'Learty. Is Mr. Goodwin there?"

"Yes," I responded, quickly reviewing my recent past activities. Presently a uniformed policeman accompanied by a man in plain clothes appeared at the door.

"Were you up along the river yesterday?" says O'Learty.

"Yes," I replied. "I was up there collecting plants with my wife." At this point Esther puts in an appearance from the back room. The two men exchanged glances and began to grin.

"We had a report that you were burying something; we have had a posse of men up there digging all morning!"

A man who had been picking over a nearby dump had observed our suspicious activity and reported the number of our car to the police. What would have happened if they had found an empty apartment and had caught up with us as we were embarking on our transatlantic voyage to Africa?

While in graduate school I may have had the distinction of taking the first integrated course at Harvard—advanced taxonomy with Fernald. I was the only male who registered; there were three women from Radcliffe. I doubt that there was any consultation on this matter with the Dean. One of the women was Ruth Peabody. She married my classmate, George Rossbach, and stayed on at the Herbarium to help illustrate the eighth edition of *Gray's Manual*. She and I became good friends and have remained in touch. Fifty-four years later Esther and I were invited to join Ruth and her second husband, Ian Berendsen, on a fascinating trip to New Zealand. Ian, a native of that country, worked for many years at the United Nations. He was going home on family business, and they asked us to accompany them and visit some of Ian's favorite haunts. One of my adventures on that trip was walking the famous and very beautiful Milford Track.

As a graduate student I spent several summers in the field. One was collecting plants in the arid Southwest, where I camped in the back country with geology students working on their doctoral dissertations.

In 1935 I spent six weeks at the Atkins Institution of the Arnold Arboretum, a botanical garden established in 1900 by Mr. Edwin F. Atkins of Boston, and located on his sugar plantation at Soledad, Cienfuegos, near the southern shore of Cuba. There I had an opportunity to study the magnificent collection of trop-

ical trees and shrubs that had been assembled, and to make a four-day foray into the Trinidad Mountains, where most of the original vegetation had already been cut over or seriously disturbed. One of my vivid memories was the problem posed by an exotic legume, *Dichrostachys glomerata*, known locally as aroma mala. This woody weed, spreading rapidly from stolons, had completely taken over large areas. It forms impenetrable thickets of spiny stems that are very difficult to eliminate.

From Cuba I sailed to Panama and spent an unforgettable week in the rainforest of Barro Colorado Island. The Island was formed during the construction of the Panama Canal, and is a preserve under the management of the Smithsonian Institution.

My cousin Mary Linder, the sister of David Linder, who served for a number of years as the director of the Farlow Herbarium, married Patrick Putnam. They ran a camp in the Epilu forest of what was then the Belgian Congo. When I became engaged she invited Esther and me to visit them on our honeymoon. We got married in the fall, while I was in the midst of finishing my thesis, but the prospect of going to Africa was an exciting one and we spent our spare minutes during that winter planning an expedition. We obtained lots of sound advice from such seasoned travellers as Thomas Barbour and Arthur Loveridge, both at the Museum of Comparative Zoology.

We set out on this adventure in the summer of 1937—a rather circuitous route to Copenhagen, where we were to spend the winter on an American-Scandinavian Fellowship studying plant hormone techniques with Professor P. Boysen Jensen. By that time we discovered that the Putnams were returning to the States, so we were entirely on our own. We went by sea through the Suez Canal, the Red Sea, and Indian Ocean to Tanga, in what was then Tanganyika, and traveled by stages through that country, Kenya, Uganda, Ruanda, and the eastern edge of the Belgian Congo. Among our special adventures were ascents of Mt. Kilimanjaro and Mt. Elgon. From a botanical point of view we found the cloud forests and open mountain vegetation especially entrancing. I was able to collect among other species some of the huge woody Senecios and Lobelias, which grow at those high altitudes on the equator, and to ship them back to the Gray Herbarium.

It is interesting to note that way back in those days the area where overpopulation appeared most pronounced was Ruanda. There seemed to be a native behind every bush! We drove

through Goma, one of the towns that today has been so much in the news—the very site of population dislocations, starvation, and atrocities.

My first academic post was at the University of Rochester. There were only two of us in the Botany Department. As the junior member it fell my lot to become the curator of the University Herbarium which numbered quite a few thousand mounted specimens. Some of these were the property of the University and many were on loan from the Rochester Academy of Science. In addition there were huge piles of unmounted material. It proved to be a fine collection, largely the work of amateurs, notably Milton S. Baxter and Warren Matthews, but also men like Walter Phillips and Ellsworth P. Killip, who had grown up in Rochester and moved away to become professionals. I had the good fortune to meet these men and learn from them about the botanically exciting areas in the vicinity.

During my six years at Rochester I managed to sort through the entire herbarium, getting the collections in order, supervising the mounting of specimens and discarding the inadequately labeled material. One day, while sorting through unmounted specimens, out fell an old letter in brown ink on paper yellowed with age. The author turned out to be John Torrey, writing to his friend at Williams College, Chester Dewey. It was interesting. I copied it before depositing the original in the archives of the University Library. I remember wondering at the time when, if ever, this document would next see the light of day. About nine months later I was reading a newly published life of Torrey by A. Hunter Dupree, when I came upon a familiar passage. Suddenly it dawned on me that it was a quotation from that letter I had salvaged from the herbarium. The biographer must have retrieved it within days of the time I turned it over to the Library!

As curator of the Herbarium I came to meet Royal E. Shanks, an ecologist working on the flora of Monroe County within which Rochester is located. He and I became good friends and collaborated on a list of new records of plants for the county (Shanks and Goodwin 1943). At the same time I put together a flora of Mendon Ponds Park—a botanically rich bit of glacial moraine, dotted with lakes, eskers, and kettles, lying a few miles south of the city (Goodwin 1943). Forty-six years later this list was updated by the New York State Museum (Mitchell et al. 1989). It

lists 849 taxa of vascular plants, adding some 86 species to my original list.

Bergen Swamp is a 2000-acre wetland situated about twenty miles west of Rochester. Originally a post-glacial depression underlain by the Niagara limestone, it had become gradually filled in with white marl deposits and invaded by a rich diversity of plant and animal species (Muenscher 1946). Some of these, such as the small white lady's slipper (*Cypripedium candidum*) and Houghton's goldenrod (*Solidago houghtonii*) that grow on the open marl beds, are rare. This wetland had an enormous appeal to me and I soon learned that I shared this interest with a group of local people who, in order to preserve the area, had formed the Bergen Swamp Preservation Society. Although in existence for several years, the Society had not, by the time I joined it, been able to make any headway in acquiring real estate. The land ownership was very complex. The swamp supports extensive stands of white cedar (*Thuja occidentalis*), and every farmer for miles around owned a narrow strip as a source of rot-resistant fence posts.

The Society lacked the resources to finance a survey. Not daunted by this I obtained a free aerial photograph of the area from the Soil Conservation Service, which showed the wooded boundaries of the swamp surrounded by the geometric pattern of the adjacent farms. An old county atlas showed the ownership pattern not only of the farms, but also of the woodlots within the swamp. A passable map was then constructed by superimposing the two. With this as a base I then began to visit farmers in the neighborhood of the swamp and soon encountered one who was willing to sell his five-acre lot on the periphery for \$125. The Trustees of the Society approved this initial purchase, which was soon followed by others, including a beautiful 25-acre tract known as Hemlock Knoll. Esther and I made several modest contributions toward these early land acquisitions while I was the Society's treasurer. Today, over fifty years later, the Society owns most of the two thousand acres and employs a full-time warden. The swamp has been designated a National Natural Landmark by the National Park Service. Thus for me began a lifetime involvement in the preservation of natural areas, which later developed into a close association with The Nature Conservancy.

In 1944 we moved to New London, Connecticut, where I joined the faculty of Connecticut College and became the director

of its Arboretum. At that time the campus was situated at the northern edge of town and was surrounded on three sides by abandoned farms and wild land. My predecessor, George S. Avery, Jr., had already initiated a land acquisition program which I continued to pursue with vigor. As a result the Arboretum has been expanded from 90 to over 450 acres. In 1952 the College trustees were persuaded to set aside a wild section as the Bolleswood Natural Area, and a long-range ecological study was initiated (Niering and Goodwin 1962). The extensive data set that has been accumulated over the past 44 years has provided generations of students with ecological field experiences and is now being analyzed as a doctoral dissertation by a student at Duke University.

In 1956, as a joint venture with Dr. and Mrs. John M. Ide, we acquired a farm in East Haddam, about 16 miles northwest of New London. Four years later we all made an initial gift to The Nature Conservancy of a piece of the land along Burnham Brook, which traverses the property. We then bought out the Ides' half interest in the remaining property. From this modest beginning the Burnham Brook Preserve has gradually grown through purchases and gifts, in which neighbors have participated, to over 850 acres. Inventories of the biota (published as *Studies in Human Ecology*, Connecticut College) have documented the rich biodiversity of the area, which has now become a part of one of The Nature Conservancy's Last Great Places—the lower watershed of the Connecticut River. It is in the middle of this lovely spot that we are fortunate enough to enjoy retirement.

LITERATURE CITED

- GOODWIN, R. H. 1943. The Flora of Mendon Ponds Park. Proc. Rochester Acad. Sci. 8: 233–298.
- . 1944. The inheritance of flowering time in a short-day species, *Solidago sempervirens* L. Genetics 29: 503–519.
- MITCHELL, R. S., F. R. WESLEY, AND B. H. ALLEN. 1989. Annotated checklist of the flora of Mendon Ponds Park. State Botanist's Office, N.Y. State Museum, Albany, NY.
- MUENSCHER, W. C. 1946. The vegetation of Bergen Swamp. I. The vascular plants. Proc. Rochester Acad. Sci. 9: 64–117.
- NIERING, W. A. AND R. H. GOODWIN. 1962. Ecological studies in the Connecticut Arboretum. I. Introduction and survey of the vegetation types. Ecology 43: 41–54.
- SHANKS, R. E. AND R. H. GOODWIN. 1943. Notes on the flora of Monroe County, New York. Proc. Rochester Acad. Sci. 8: 299–331.